April 22, 1964

MEMORANDUM FOR THE RECORD

FROM: Melvin A. Eisenberg

SUBJECT: Conference of April 14, 1964, to determine which frames in the Zapruder movies show the impact of the first and second bullets.

On April 14, 1964, a conference was held to determine which frames in the Zapruder film portray the instants at which the first and second bullets struck.

Present were: Commander James J. Humes, Director of Laboratories of the Naval Medical School, Bethesda, Maryland; Commander J. Thornton Boswell, Chief Pathologist, Naval Medical School, Bethesda; Lt. Col. Pierre A. Finck, Chief of Wound Ballistics Pathology Branch, Armed Forces Institute of Pathology; Dr. F. W. Light, Jr., Deputy Chief of the Biophysics Division at Edgewood Arsenal, Maryland, and Chief of the Wound Assessment Branch of the Biophysics Division; Dr. Olivier, Chief of the Wound Ballistics Branch of the Biophysics Division at Edgewood Arsenal; Messrs. Malley, Gauthier, Shaneyfelt, and two other unidentified agents of the FBI; Messrs. Kelley and Howlett of the Secret Service; and Messrs. Redlich, Specter, and Eisenberg of the Commission staff.

A screening was held of the Zapruder film and of slides prepared by LIFE from the film. Each slide corresponded with a separate frame of film, beginning with frame 171. The consensus of the meeting was as follows:

(a) The President had been definitely hit by frames 224-225, when he emerges from behind a sign with his hands clutching at his throat.

(b) The reaction shown in frames 224-25 may have started at an earlier point—possibly as early as frame 199 (when there appears to be some jerkiness in his movement) or, with a higher degree of possibility, at frames 204-06 (where his right elbow appears to be raised to an artificially high position).

(c) If the reaction did not begin at 199 or 204-06, it probably began during the range of frames during which the President is hidden from Zapruder's camera by a sign, namely, frames 215-24.

cc: Mr. Rankin
Mr. Willens
Mr. Redlich
Mr. Ball
Mr. Belin
Mr. Specter
Mr. Eisenberg

(d) The President may have been struck by the first bullet as much as two seconds before any visible reaction began. In all likelihood, however, the maximum delay between impact and reaction would be under one second, and it is possible that the reaction was instantaneous. Putting this in terms of frames, the President may have been struck as much as 36 frames before any visible reaction is seen. If the visible reaction begins at 199, the President may have been struck as early as 163; if the visible reaction begins at 204-06, he may have been struck as early as 168-170; if the visible reaction begins while the President is behind the sign, he may have been struck as early as 179-188.

(e) The velocity of the first bullet would have been little diminished by its passage through the President. Therefore, if Governor Connally was in the path of the bullet it would have struck him and (probably) caused the wounds he sustained in his chest cavity. Strong indications that this occurred are provided by the facts that (1) the bullet recovered from Governor Connally's stretcher does not appear to have penetrated a wrist and (2) if the first bullet did not hit Governor Connally, it should have ripped up the car, but apparently did not. Since the bullet recovered from the Governor's stretcher does not appear to have penetrated a wrist, if he was hit by this (the first) bullet, he was probably also hit by the second bullet.

(f) If Governor Connally was hit by both the first and second bullets, it is impossible to say definitively at what point, or by what point, he had been hit by the second bullet.

(g) Governor Connally seems to straighten up at frames 224-26, and may be reacting to a wound at this point. (If so, it would be a wound from the first bullet.)

(h) Governor Connally seems to begin showing an expression of anguish around 242. If he was hit with two bullets, this expression may have resulted from his second wound.

(i) After Governor Connally straightened up at frames 224-26 he starts a turn to the right. As a result of this turn, at no time after frame 236 was Governor Connally in a position such that a bullet fired from the probable

site of the assassin would have caused the wound in the chest cavity which Governor Connally sustained--that is, after frame 236, the Governor presented a side view to the assassin rather than a back view.*

(j) It is not possible to say whether prior to 236 Governor Connally was over in a position such that one bullet could have caused the five wounds he sustained.

(k) As in the case of the President, Governor Connally could have conceivably been hit two seconds before he begins to react, but the maximum likely time interval between hit and reaction is one second, and the reaction may have been instantaneous. The likelihood of an instantaneous reaction is particularly great in regard to the wrist wound, since pain is usually felt more quickly in a limb than in the torso.

---

*/ Mr. Specter disagrees with this, and feels the Governor was in position to receive the chest wound up to 242.